

### Remarks

The pending claims are 16 and 18-25.

#### Applicants' Invention

Appellants' invention is directed to a fluidized-bed, gas-phase, process for manufacture of vinyl acetate from ethylene, acetic acid, and oxygen. In Appellants' process, separate feed streams primarily containing hydrocarbons and oxygen and an inert material are introduced into a fluidized bed reactor, such that neither feedstream nor the outlet gas from the reactor is within flammability limits. However, during operational intervals of the claimed process, the total amount of oxygen used is higher than may normally be used without danger of flammability even though the oxygen concentrations in the feedstreams are constrained by safety concerns of creating an explosive mixture, separation of the feedstreams results in an effective higher usage of oxygen in the reactor. This increases the oxidation efficiency of the catalytic oxidation reaction.

Separation of the primary oxygen feedstream from the primary hydrocarbon feedstream is possible in Appellants' fluidized system because the fluidization medium in the reactor will prevent uncontrolled oxidation at the point of entry of the oxygen feedstream into the reactor. In contrast, a separate introduction of high concentration oxygen into a fixed bed catalytic reactor system would not be possible because of the probable creation of a "hotspot" at the point of entry.

Appellants' invention results in a more efficient oxidation reaction within acceptable safety restrictions.

#### Prior Rejections and Arguments

Applicants note the rejections of the claims submitted in this application basically are the same as made in the parent case. Without unduly burdening the record, Applicants incorporate by reference their arguments made in the Appeal Brief submitted in the prior application with respect to the cited references together with evidentiary submissions including the Williams Declaration.

In reply to Applicants' claim amendments in the previous Response relating to limitations on operation of the claimed process based on total amount of oxygen used, the latest Action states:

"The claim limitation as to total oxygen content is not seen to be substantially different from what is taught by the prior art. The claims appear to read on the amount exemplified in the prior art, note Example 2 of the references uses 8% oxygen which is apparently within the claimed range. Note applicants' claim 26 which indicates that the amount may be 8%. Also, note the top portion of page 9 of the specification that the amount may be 8%."

Applicants' Specific Response To Arguments Made in the Final Rejection

As noted in the prior Response, independent claim 16 and independent claim 27 include a further element that the process is conducted with a total oxygen content (if the feed streams were to be combined) which is higher than may be used without danger of flammability. The language of claim 16 states "...the total amount of oxygen employed is higher than may be used without danger of flammability, if all feed streams were combined." The language of claim 27 states the "...levels of oxygen are employed higher than may be used in a fixed bed reactor, without danger of flammability...."

Thus, a primary limitation contained in these independent claims is directed to the total oxygen content of the feedstreams in relation to the flammability limit for the particular system employed. Applicants submit that the prior art does not teach or suggest this primary limitation.

The Examiner's argument is directed to a dependent claim (claim 26) and to a description in the Specification. This claim (along with dependent claim 28) only indicates that in some particular systems the total oxygen amount used may be in the range of 8 to 25 volume percent. However, for operation within the claimed process, that total oxygen amount must satisfy the aforementioned limitation related to the flammability limit for the particular system used.

Review of the Specification at page 9, lines 3-12, teaches that the gaseous feed concentrations of ethylene, acetic acid, and oxygen may vary, and typical ranges are provided. These include ethylene – 30 to 70%; acetic acid – 10 to 25%; oxygen – 8 to 25%; and the balance composed of inert material. There is no indication that for every combination of gaseous components, 8 vol.% of oxygen is within the flammability range. Thus, the comparison of a set of ranges stated in the specification and a particular composition indicated in Example 2 of the Sennewald et al. references is unsupportable.

Applicants submit there is no evidence that the specific composition of input gas in Sennewald et al. Example 2 (i.e., 64 vol.% ethylene, 16 vol.% acetic acid, 8 vol.% oxygen, 12 vol.% carbon dioxide) approaches the flammability limit for that mixture. It should go without saying that no sensible person skilled in the art would use a single feedstream composition that is in danger of explosion.

In summary, a range of potential oxygen contents in a dependent claim cannot trump the primary limitation in the independent claim that the total amount of oxygen in both feedstreams (if the feedstreams were combined) must be higher than may be used without danger of flammability. The cited prior art simply does not teach or suggest such limitation.

#### Applicants' Further Arguments Regarding the Pending Claims

Applicants believe that manufacture of vinyl acetate using higher levels of total oxygen (if all streams were combined) during operation of their claimed process is more efficient than using other processes and process conditions described in the prior art. Specifically, even if the Sennewald and Calcagano teachings could be properly combined, there is no description in any of those documents that teaches or suggests use of a total oxygen content, if the feed streams were combined, in an elevated regime that would be in a danger of flammability. Without such teaching or suggestion, Applicants submit that no *prima facie* basis for a rejection under 35 USC §103(a) has been made.

The Examiner urges that "no unexpected result is seen for supplying oxygen separately at the same concentration as suggested in the prior art and applicants do not present any persuasive evidence that their process would afford any expected result when operating at the prior art oxygen feed rates." (emphasis added.) However, the pending claims now do require operation of the process at higher oxygen feed rates during operation of the claimed process. Clearly, this aspect of Applicants' invention was not suggested by any of the cited documents.

Specifically, the Sennewald documents only describe a fluid bed process with a single feed input. No where in those documents is suggested operating at an oxygen feed rate that would approach the flammability safety limits. Although the Calcagano reference describes introducing oxygen separately from ethylene/acetic acid in a liquid-phase process, there is no suggestion that the oxygen feed would approach safety

limits. Therefore, only Applicants have described and claimed a process of using higher oxygen feed, which lead to higher product throughput.

Summary

Applicants' currently-presented claims require features not described in the cited art. Significantly, all of the pending claims now require operation of a process using oxygen feeds higher than the art would have considered acceptable in regard to safety. This operation directly leads to higher activity and throughput and more efficient operation. Thus, Applicants submit that all pending claims are in condition for allowance and request the Examiner to reconsider the rejections.

Respectfully submitted,

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